

Remarks

Reconsideration is requested.

The Examiner has objected to the form of claims 29-32. Applicants have accordingly amended such claims to overcome the stated objection.

The Examiner has rejected claims 1, 3-5, 15 and 17-19 under 35 U.S.C. 103(a) as being unpatentable over Cuomo et al. in view of Ceasar et al.

Claims 2 and 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Cuomo et al. in view of Ceasar et al. and Baldwin et al.

Claims 6, 8, 9, 25, 27, 28 and 30-32 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. in view of Ceasar et al.

Claim 7 has been rejected under 35 U.S.C. 103(a) over Kanda et al. in view of Ceasar et al. and Baldwin et al.

Claims 10, 12-14, 20, 22-24 and 30-32 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. in view of Cuomo et al. and Ceasar et al.

Claims 11, 21 and 26 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. in view of Cuomo et al., Ceasar et al. and Baldwin et al.

Claim 29 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Cuomo et al. in view of Ceasar et al. and Baldwin et al., or over Kanda et al. in view of Ceasar et al. and

Baldwin et al., or over Kanda et al. in view of Cuomo et al., Ceasar et al. and Baldwin et al. and Kaufman et al.

Applicants have canceled claims 6-9 and 25-28. Accordingly, the rejections of those claims have been obviated.

Attached hereto is a Declaration of Harold R. Kaufman, one of the named inventors in the above-identified application. Dr. Kaufman clearly explains the essential differences between the present invention and the teachings of the cited references. As Dr. Kaufman explains, he is the inventor of the "Kaufman ion source" referred to by the Ceasar et al. and Cuomo et al. patents. Such ion source, which is described in U.S. Patent 3,156,090 and in Chapter II-5 of *Thin Film Processes* attached to the Declaration, has a range of operation of 500 to 2000 eV.

In the presently claimed invention, the ion beam energy is at or below 50 eV, and the target must be biased negative relative to ground. Neither Ceasar et al. nor Cuomo et al. describe or suggest this combination of features as required by applicants herein. Further, both the Ceasar et al. and Cuomo et al. patents describe high energy ion-beam sputtering processes which require the ion beam to be directed at the target. Applicants' invention does not have this limitation.

The Baldwin et al. patent refers to a method for controlling deposition thickness using a rotating substrate. The patent does not describe use of an ion source having an energy of 50 eV or less.

The Kanda et al. patent refers to the use of a plurality of ion beam sources and sputter targets. The patent does not describe use of an ion source having an energy of 50 eV or less.

The Kaufman '032 patent describes an end-Hall ion source. The patent does not describe sputter deposition apparatus as specified in the present invention. Further, the poorly defined nature of the ion beam in the '032 patent would not permit the end-Hall source to be used in the apparatus of Ceasar et al.

Thus, none of the cited patents teach sputter deposition apparatus or methods which use (a) an ion source producing ions having an energy of about 50 eV or less, and (b) a plurality of targets biased negative relative to ground.

In applicants' invention, the ion source operates at low energy and the energy required for sputtering is provided by biasing the targets negative relative to ground. None of the cited references, either alone or in combination, teach or suggest apparatus that would be capable of operating in the manner claimed by applicants.

In the apparatus of both Cuomo et al. and Ceasar et al., the ion energy required for sputtering must be provided by the ion source itself. Further, the ion beam must be directed onto the target to prevent the deposited film from being contaminated with sputtered material from adjacent hardware. Applicants' claimed invention avoids these problems by operating at low energy and biasing the targets negative relative to ground.

The Examiner has attempted to select various unrelated features from prior patents and combine them using applicants' own disclosure as a blueprint. However, the prior patents do not contain any teaching which would suggest that combination of their features would be desirable or appropriate. Even if Ceasar et al. is combined with Cuomo et al. or any of the other cited references, those combinations fail because none of those patents describes biasing the target negative relative to ground for the purpose of increasing the ion energy to reach the level of energy required to obtain sputtering. The other cited references do not teach this necessary feature either. Therefore, combination of all the cited references would not lead to the present invention.

The Examiner's attention is also directed to the decision of the Board of Patent Appeals & Interferences in Appeal No. 2002-1148 (Application No. 09/471,662), dated April 25, 2003, involving three of the same inventors as are named inventors herein. The Board was persuaded by Kaufman's declaration that sputtering using the ion source referred to by Ceasar et al. was impossible at an ion beam energy at or below about 50 eV unless the target has a negative bias. Accordingly, the Board reversed the Section 103(a) rejection of applicants' method claim.

In view of the foregoing remarks, and the attached Declaration of Harold R. Kaufman, applicants submit that the Section 103(a) rejections have been overcome. Reconsideration and favorable action are courteously solicited.

If there should be any questions concerning this matter,  
please contact the undersigned attorney.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

The undersigned hereby certifies that the foregoing Amendment  
and the attached Declaration are being facsimile transmitted to  
the U.S. Patent & Trademark Office on December 23, 2003.

Date: December 23, 2003

*Dean P. Edmundson*  
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